# EMILY ZENG

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## Skills Summary

### Languages

- Python
- C++

### Technologies / Tools

- Keras/Tensorflow
- LSTM
- CNNs
- Sk-learn
- Flask
- Q-learning

## Education

**University of Waterloo**
Mechatronics Engineering
2016 – 2021

## Work Experience

**Computer Vision Intern** | NVIDIA – Autonomous Vehicles — May-Aug 2020

Time series light signal detection for autonomous vehicles

- Detecting of blinking light signals, eg. turn signal, brake signal, hazard lights, etc.
- Laid groundwork by defining labelling guidelines, potential model architectures
- Trained proof of concept classification network using public data

**Computer Vision Intern** | Miovision, Waterloo — Sep-Dec 2019

Traffic data analysis with computer vision

- Led project to introduce active learning techniques to data ingest pipeline
- Optimized selection of images for labeling from large unlabelled pool via estimating model uncertainty (monte carlo dropout)
- 42% improvement in mean average precision between model trained on most uncertain images compared to the least

**Computer Vision Intern** | Synapse Technology, Palo Alto — Jan-April 2019

Developed and analyzed CNN models for detecting threats in security x-ray scans

- Developed fine grain rotational data augmentation method for object detection
- Significantly improved model performance in underrepresented classes
- Trained and evaluated production models used in airports across the world

**Data Scientist** | Praemo, Waterloo — May-Aug 2018

Built a neural network library to predict machine failure in industrial robots

- Used LSTM to develop a general library for detecting anomalies in time series
- Pre-processed client data and applied neural networks to monitor robot conditions, then evaluated and visualized data and results

**Robotics Software Developer** | ESI, Markham — Sep-Dec 2017

Solved robotic navigation problem using reinforcement learning (Q-learning)

- Trained a deep neural network using Q-learning to move robot to a destination
- Converted trained model to C++ to fit it on a microcontroller
- 95% success rate in simulation and 85% success rate on actual robot

**ML Course Developer** | Stackup/NUS, Singapore — Jan-April 2017

Assisted in developing machine learning driven data science course

## Projects

**Um Detector** – Hack the North — Sep 2019

- Audio classifier for conversational filler words (ie "um")
- Trained CNN (Convolutional Neural Net) to classify spectrograms from audio

**SimpleYogi** – Hack Princeton — Nov 2019

- Yoga pose correction and classification with Posenet

**Quiz it!** – Yhacks, Yale — Dec 2017

2nd place overall, winner of Google API prize and Best Education Hack

- Translated photos of text into fill-in-the-blank questions for Alexa skill
- Extracted important sentences and removed highest salience noun
- Dereferenced pronouns by assuming a Subject-Verb-Action structure